ELBOW DISLOCATION WITH AVULSION OF THE MEDIAL HUMERAL EPICONDYLE

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After dislocation of the elbow with avulsion of the medial epicondyle, the management of the latter is controversial. Of 28 children followed up after initial closed reduction of the elbow, 19 had a satisfactory closed reduction of the epicondyle and were treated in plaster. At follow-up, 11 children had a normal elbow and eight had lost an average of 15° of flexion.

Nine children had had open reduction and internal fixation of the fragment, one for an open injury, three for displacement of the epicondyle and six for intra-articular entrapment of the fragment. Five of these children had ulnar nerve contusion or compression, four requiring anterior transposition of the nerve. At review, only three had normal elbows and six had lost an average of 37° of flexion. We agree with other authors that surgery is indicated only for children in whom the epicondyle is trapped in the joint or is significantly displaced after closed reduction.

When avulsion of the medial humeral epicondyle is associated with dislocation of the elbow in a child, the management of the epicondyle is controversial and the results are uncertain. We report a retrospective review of 32 children with this injury to assess the factors which affect the results.

PATIENTS AND METHODS

From 1966 to 1984, 27 boys and five girls were treated at the Mohamed Kassab National Orthopaedic Institute, Tunisia for this injury. Their average age was 12 years (6 to 16). In 17 children the right elbow was involved and in 15 the left. The average delay between the injury and treatment was less than 24 hours (4 hours to 4 days). One child had a small Gustilo type I wound in front of the elbow.

On initial radiographs 22 patients had a posterolateral dislocation (Figs 1a and 1b), nine had a posterior dislocation, and in one the dislocation was lateral. The medial epicondyle was always displaced and three patients had a flake fracture of the metaphysis. One child had a fracture of the medial epicondyle, only part of which was displaced.

One child had reduced the dislocation himself; in all the others the elbow was reduced closed under general anaesthesia. In 21 cases the medial epicondyle had returned to within a few millimetres of its normal position (Fig. 1c), and the limb was placed in a plaster cast for three weeks with the elbow flexed to 90° and the forearm in neutral rotation.

In three children in whom the epicondyle remained displaced by more than 1 cm, and in the single open fracture, the fragment was reduced surgically through a medial approach and sutured, pinned or screwed into place. The one sutured epicondyle displaced postoperatively in the cast. The pinned patient had simultaneous transposition of the contused ulnar nerve and a good result. After open reduction and fixation with a screw, one child developed ulnar nerve paralysis; this persisted and the nerve was transposed six months later with almost complete recovery. The patient with an open fracture had wound debridement, and the epicondyle was reduced and fixed with two K-wires. A wound infection developed in spite of prophylactic antibiotics; this was treated by irrigation and continued antibiotics.

In seven children the epicondyle was trapped in the joint after closed reduction (Fig. 2). In five of these children, the epicondyle was re-attached to the humerus by two K-wires through the medial approach; in one of them the ulnar nerve was transposed anteriorly because it was contused. In the other two children air was injected into the joint to expel the epicondyle. This technique was successful in one instance, and the arm was treated in a
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Radiographs of a 12-year-old boy with posterolateral dislocation of the elbow and avulsion of the medial epicondyle. On the anteroposterior view (a) the epicondyle is hidden behind the distal humerus, which appears symmetrical, but on the lateral view (b) the fragment is obvious. After reduction (c) the epicondyle is displaced only a few millimetres from its normal position.

Fig. 1a  Fig. 1b  Fig. 1c

Post-reduction anteroposterior and lateral radiographs of a 15-year-old boy's elbow. The medial epicondyle, visible on both views, is in the joint. The patient was treated by open reduction and internal fixation by two K-wires.

Fig. 2

cast. In the other child the epicondyle remained in the joint and needed surgical re-attachment and transposition of the ulnar nerve for signs of compression after the attempted closed reduction. Postoperatively there was complete ulnar nerve anaesthesia and paralysis. Eventually there was full motor recovery and partial sensory recovery. One patient with postoperative ulnar nerve paralysis recovered fully.

RESULTS

Of the 22 children treated by closed reduction three were not reviewed after cast removal, leaving 19 who were followed for an average of 17 months (7 to 30). All were pain-free with stable elbows. Flexion at the elbow was normal in 11 patients; eight had lost an average of 15° of movement (5° to 45°). Radiographs were normal in 12, six patients showed separation of the epicondyle from the humerus by 3 to 5 mm, and one had peri-articular calcification on the lateral side of the elbow.

Of the 10 patients treated surgically one was lost to follow-up. The other nine were followed for an average of 20 months (6 to 28). The range of flexion was normal in three patients while six had lost an average of 37° (20° to 60°). There was no elbow instability and no loss of forearm rotation. Radiographs showed soft tissue calcification around the lateral side of the elbow in six patients and one had a pseudarthrosis of the epicondyle. There was no difference between the group who had open reduction for incarceration of the epicondyle, and the group whose surgery was for marked displacement of the fragment.

DISCUSSION

Avulsion of the medial humeral epicondyle by the flexor muscles and medial collateral ligament is often associated with dislocation of the elbow (Granger 1818; Higgs 1936; Judet, Judet and Lagrange 1958; Lindham and Hugosson 1979; Wilson 1982). Pelet (1978) states that a flake of metaphysis is frequently attached to the fragment. In only three of our patients did this occur.

The epicondyle is small, and when displaced it is difficult to see on an anteroposterior radiograph: it may be overlapped by the distal humeral metaphysis (Fig. 1a), or in a very young patient it may be confused with an ossification centre of the trochlea (Fig. 2) (Aitken and Childress 1938; Patrick 1946; Chessare et al 1977; Martini et al 1978). If the distal humerus appears symmetrical on an anteroposterior radiograph (Fig. 1a), or if the epicondyle is visible on the lateral radiograph (Fig. 2), then the epicondyle must be displaced (Patrick 1946; Martini et al 1978). In doubtful cases, radiographs of the normal elbow and stress radiographs are helpful (Smith 1972; Rang 1983).
The management of the avulsed epicondyle is controversial. If the epicondyle remains displaced, or there is non-union, the elbow may be unstable (Higgs 1936; Pelet 1978; Schwab et al 1980). Some authors advocate open reduction and internal fixation of the epicondyle in all cases to prevent this (Higgs 1936; Pelet 1978; Schwab et al 1980), but Wadsworth and Haddad (1982) and Rang (1983) consider that surgery is indicated only for the unstable elbow, or for an epicondylar displacement of more than a few millimetres. Other authors state that final disability is slight whether the epicondyle is united or not, and that operation should be reserved for intra-articular incarceration of the fragment (Roberts 1934; Patrick 1946; Judet et al 1958; Wilson 1960; Martini et al 1978). We agree with this view.

When the epicondyle is trapped in the joint, the fragment must be removed. Masse (1955) injected air into the joint before reducing the dislocation to prevent the epicondyle being sucked into the joint during reduction and was successful in three of four cases. In two patients we injected air after reduction, and were successful in one. Either method seems worth attempting. Closed manipulation with the elbow in valgus may damage the ulnar nerve (Fairbank and Buxton 1934; Patrick 1946), so these and other authors advocate open reduction, with either excision of the epicondyle and suture of the superficial flexors, or re-attachment (Aitken and Childress 1938; Pelet 1978). We recommend open reduction and internal fixation with two K-wires as the safest management.

The management of an injured ulnar nerve is also controversial (Marion and Fayse 1962; Wilson 1982). We transposed the nerve in four children; all had good results. Another child with postoperative ulnar paralysis had complete spontaneous recovery. We agree with those authors who advise anterior transposition only for patients with signs of nerve compression (Fairbank and Buxton 1934; Pelet 1980; Papavasiliou 1982).

Eleven of the 19 patients in our series who were treated by closed reduction had normal elbows and eight lost only 10% of movement. Fibrous union did not affect the result. By contrast, of nine patients who had surgery, six lost an average of 24% of the range of movement, reflecting the additional trauma of surgery. However, the recovery of elbow mobility may continue for 18 months or more (Kilfoyle 1965; Rang 1983). So some of these patients may continue to improve.

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REFERENCES


